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# REMARKS

# ON

# Mounting Materials for Histological Specimens, with Special Reference to Glycerine and Balsam.

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By Carl Seiler, M. D.

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The great diversity of opinion as to the best material for mounting histological specimens has its origin in the fact that no one material is the best in every case, and that the microscopist having become accustomed to one or the other, uses it in every case, and is satisfied with the results obtained. But this should not be, and will not be as soon as it is generally understood by workers in histology in what case to deviate from the one or the other method of mounting; and the few remarks I wish to make on the subject are intended to call forth discussion and expression of opinion from different microscopists, so as to come a little nearer the truth than at present. All mounting materials intended for permanent preservation of specimens are divided into two classes, viz., Aqueous and Resinous, each of which comprises many members of greater or less utility, and whose representative members are Glycerine and Canada Balsam.

*Glycerine*, as a mounting material, has many advantages and disadvantages which, according to my own limited experience, I will point out. A section or small piece of tissue to be mounted in this medium need not be placed in alcohol. thus avoiding shrinkage and distortion of its histological elements, and the index of refraction of glycerine is such that fine markings, such as the striæ of the heart muscle and of the striped spindle cells of Rhabdo-Myoma, the cilia of epithelial cells and many other delicate elements are clearly seen. It has, however, the disadvantages of making the section or specimen mounted in this medium, granular, which granularity increases with age; the colors of the stain are not as brilliant and not unfrequently are affected by the glycerine, so as to fade; and finally the difficulty of preventing the glycerine from leaking out of the cells and leaving the preparation dry. I have not been able to find a plausible explanation of the granularity of a glycerine mounting, but it has been suggested that it might be caused by the glycerine dissolving the albumen of the specimen, thus altering its optical properties ; a theory which is partly borne out by the fact that vegetable preparations are not as liable to become granular by age when mounted in glycerine.

*Balsam*, on the other hand, as a mounting material, is more satisfactory in many respects, especially for permanent mounting. It takes less time to mount in it than in glycerine, no granularity is observed to occur in the specimen, on the contrary it becomes clearer by age, colors of stainings are more brilliant, and there is no danger of leaking, because the resinous mounting material becomes solid by drying.

The disadvantages in the use of this medium are distortion of the histological elements of the tissue by the process of dehydration either by alcohol or by drying, a shrivelling of the tissue by the action of a clearing medium, such as oil of cloves, etc. ; the formation of crystals in the mounting medium as it becomes hard, and the length of time the specimen has to be laid aside before it can be handled without danger of its becoming dismounted. Many of these disadvantages may, however, be overcome by a modification of the old process of mounting in resinous media, so that it becomes, in most instances, the best method : therefore a short description of it will not be out of place.

Take a clear sample of Canada Balsam and evaporate it in a water or sand bath to dryness ; *i. e.*, until it becomes brittle and resinous when cold. Dissolve this while warm in warm *absolute* alcohol (Squibbs'), and filter through absorbent cotton. Place the section, after it has been stained, in weak alcohol (about ·60), and allow it to remain in a few minutes, then transfer it to ·80, ·95, and finally to absolute alcohol, in which it should remain a few minutes also. Then transfer it to the slide (which has been slightly warmed above a spirit lamp so as to remove all moisture), drain off all superfluous alcohol and place a drop of the alcoholic balsam solution on the specimen. In a few seconds the latter will become transparent, when it may be covered and set aside to dry. In damp weather, or when breathed upon, a milky edge will be noticed on the drop of balsam which is caused by minute globules of water, which, however, may readily be dispelled by the application of a little heat to the under side of the slide. It will be seen that by the *gradual* dehydration of the specimen the danger of distortion of the histological elements is materially diminished; that by the omission of any clearing agent the shrivelling is avoided as well as the solution of fat in the cells is prevented, for cold alcohol alone will not dissolve fat; and finally by evaporating the balsam to dryness all other constituents except the pure balsam are driven off, so that the danger of crystallization is avoided.*

There is one mounting medium which stands between glycerine and balsam, and which combines many of the advantages of both media. This is Farrant's medium, a mixture of glycerine, gum arabic and camphor water. It is admirably suited for mounting delicate membranes and embryonal tissues. Its index of refraction is similar to that of glycerine, while tissues mounted in it do not become as granular or fade as much as in glycerine. It also becomes hard like balsam, thus avoiding the difficulty of leakage. In using this medium great care should be exercised in excluding air bubbles, for if once introduced they can not be gotten rid of.

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*I am indebted to Dr. S. S. Woodward for the idea of doing away with the clearing agent and of evaporating the balsam.